UNIVERSITI PUTRA MALAYSIA

SUSTAINAGILITY MODEL AND ITS EFFECTS ON THE MALAYSIAN PALM OIL PLANTATION SECTOR

AROOP MUKHERJEE

FP 2016 10

SUSTAINAGILITY MODEL AND ITS EFFECTS ON THE MALAYSIAN PALM OIL PLANTATION SECTOR

By

AROOP MUKHERJEE

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

May 2016

COPYRIGHT

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the Degree of Doctor of Philosophy

SUSTAINAGILITY MODEL AND ITS EFFECTS ON THE MALAYSIAN PALM OIL PLANTATION SECTOR

By

AROOP MUKHERJEE

May 2016

Chairman : Associate Professor Nitty Hirawaty Kamarulzaman, PhD
Faculty : Agriculture

There has been a growing concern about food production vis-à-vis rising global population and promoting greater sustainability across the complete supply chain. From the published reports, previous research papers, and discussions with the experts of the Malaysian Palm Oil Plantations Sectors (MPOPS), it was noted that sustainability and agility are an important aspect for the MPOPS. The MPOPS faces challenges in terms of fluctuation in the overall yields, rising costs in terms of production, processing of crude oil, sustaining existing position with improvement in position in the world market, and Round Table Sustainable Palm Oil (RSPO)/Malaysia Sustainable Palm Oil (MSPO) certification process. Therefore, the objective of this study was to investigate the effects of sustainagility model in the Malaysian palm oil plantations sector.

The study was divided into three phases. The first two phases were integrated into two rounds, namely discussions with the experts and the development of questionnaire items for the Malaysian palm oil plantations as Delphi Technique rounds. A comprehensive review of the responses received was undertaken along with discussions with the experts, which highlighted the attributes and sub-attributes of the model. The third phase of the study entailed triangulation techniques where the primary data were collected through the structured questionnaires prepared during the first and second phases which the questionnaires were given to the plantation managers and mill managers for the quantitative approach. For the qualitative approach, face-to-face interviews with three (3) top level management were conducted while 151 samples were collected from the lower and middle level managers supported the quantitative approach.

Based on the aforementioned study, the factors were determined and used to further investigate the Malaysian palm oil plantations to be sustainagile. The index was calculated and it was observed that the plantations is slightly highly agile, highly sustainable, and slightly highly sustainagile. The result also suggested that the implementation of agility and sustainability influence the organization to be

sustainagile. The results revealed that there is a positive relationship between the flexibility and sustainagility and partially mediated between the agility, sustainability, and sustainagility that enhance the organisation performance and improve its competitiveness by understanding the capabilities. Further, the results reflected that techno-organisation dynamisms act as a quasi moderator in the model that have changed the form of relationship between the flexibility and sustainagility. Hence, for the Malaysian palm oil plantations sector to be sustainagile, techno-organisation dynamism shall play a vital role. Further, the score table and matrix created will help the organisations to verify where they stand in the sustainagility index and enhance its competitiveness, improvise process innovation, attain certification, flexibility, and provide a better learning process for the employees to be sustainagile, so as to handle any radical changes within the organization.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

MODEL KEMAMPANTANGKASAN DAN KESANNYA DALAM SEKTOR PERLADANGAN KELAPA SAWIT MALAYSIA

Oleh

AROOP MUKHERJEE

Mei 2016

Pengerusi : Profesor Madya Nitty Hirawaty Kamarulzaman, PhD
Fakulti : Pertanian

Terdapat kebimbangan yang semakin meningkat tentang pengeluaran makanan dengan mengambil kira peningkatan penduduk global dan menggalakkan kemampanan yang lebih di seluruh rantaian bekalan yang lengkap. Daripada laporan yang telah diterbitkan, kertas penyelidikan terdahulu, dan perbincangan dengan pakar-pakar dari Industri Minyak Sawit Malaysia (IMSM), didapati bahawa kemampanan merupakan aspek penting bagi IMSM. Industri ini menghadapi cabaran dari segi turun naik hasil keseluruhan, kenaikan kos-kos pengeluaran, pemprosesan minyak mentah, mengekalkan kedudukan sedia ada dengan menambah baik kedudukan dalam pasaran dunia, dan proses pensijilan Meja Bulat Minyak Sawit Mampan (RSPO)/Minyak Sawit Mampan Malaysia (MSPO). Oleh itu, objektif kajian ini adalah untuk mengkaji kesan-kesan model kemampantangkasan di sektor perladangan kelapa sawit Malaysia.

Kajian ini telah dibahagikan kepada tiga fasa. Dua fasa pertama telah diintegrasikan kepada dua pusingan iaitu perbincangan dengan pakar-pakar dan pembangunan soal selidik bagi perladangan kelapa sawit Malaysia sebagai pusingan Teknik Delphi. Semakan yang komprehensif daripada respon yang diterima telah dibincangkan bersama-sama pakar dengan mengetengahkan sifat-sifat dan ciri-ciri sub-model. Fasa ketiga kajian ini melibatkan teknik triangulasi di mana data primer telah dikumpul melalui soal selidik berstruktur yang telah disediakan semasa fasa pertama dan kedua yang mana soal selidik tersebut telah diberikan kepada pengurus ladang dan pengurus kilang bagi pendekatan kuantitatif. Untuk pendekatan pendekatan kualitatif, temu ramah bersemuka dengan tiga (3) pengurusan tertinggi telah dijalankan manakala 151 sampel telah diambil daripada pengurus peringkat rendah dan sederhana bagi menyokong pendekatan kuantitatif.

Berdasarkan kajian yang dinyatakan di atas, faktor-faktor telah dikenalpasti dan digunakan untuk seterusnya mengkaji sama ada perladangan kelapa sawit Malaysia telah menjadi mampantangkas. Indeks telah dikira dan ianya telah diamati bahawa perladangan ini sedikit sangat tangkas, sangat mampan dan sedikit sangat mampantangkas. Hasil kajian ini juga mencadangkan bahawa perlaksanaan

ketangkasan dan kemampanan mempengaruhi organisasi untuk menjadi mampantangkas. Hasil kajian telah menunjukkan terdapat hubungan yang positif diantara fleksibiliti dan kemampantangkasan dan sebahagiannya menjadi pengantara diantara ketangkasan, kemampanan, dan kemampantangkasan yang meningkatkan prestasi organisasi dan menambahbaik daya saingnya dengan memahami keupayaan. Di samping itu, hasil kajian menunjukkan bahawa tekno-organisasi dynamik bertindak sebagai moderator separa dalam model yang telah mengubah bentuk hubungan diantara fleksibiliti dan kemampantangkasan. Oleh itu, untuk sektor perladangan kelapa sawit Malaysia menjadi mampantangkas, tekno-organisasi dinamik hendaklah memainkan peranan yang penting. Seterusnya, jadual skor dan matriks yang dibangunkan dapat membantu organisasi untuk mengesahkan di mana mereka berada di dalam indeks kemampanantangkasan dan meningkatkan daya saing, menambah baik proses inovasi, mencapai pensijilan, fleksibiliti, dan menyediakan proses pembelajaran yang lebih baik bagi pekerja untuk menjadi mampantangkas supaya dapat mengendalikan sebarang perubahan radikal dalam organisasi.

ACKNOWLEDGEMENTS

I am indebted to many people who helped me in this challenging PhD journey, however, I would like to first express my gratitude to God who blessed me and provided me an opportunity to undertake this PhD journey.

I am highly indebted to my supervisor Associate Prof. Dr. Nitty Hirawaty Kamarulzaman for her guidance and continuous support at every stage of my PhD work. I thank her for encouraging me to follow my ideas at my own pace in the course of my PhD. I was able to learn a lot and also enjoy the whole process of PhD. Her depths of knowledge calm and helpful attitude towards all her students will always remain an inspiration for all my life.

I would also like to sincerely thank my committee members Prof. Datuk Dr. Mad Nasir Shamsiudin and Dr. Ismail Abdul Latif and my mentor Prof. Dr. Abdul Razak Ibrahim for their generosity and providing patient reviews, comments, and thoughtful suggestions to improve this thesis. I am extremely thankful for their support during the difficult times of my research, which bolstered my confidence and made me find my way and proceed ahead. I would also like to give my greatest appreciation for their time spent on reading and commenting on my thesis. My sincere gratitude goes to the Malaysia Ministry of Education, and the Universiti Putra Malaysia for giving me this opportunity and providing me with the financial support.

I humbly extend a note of thanks to all the anonymous respondents who answered my survey questionnaire with sincerity and involvement, which made the whole survey effort interesting and enjoyable instead of a tedious and tiring one. I owe special thanks to Mr. Abdul Kadir and Mr. K. Ilangovan for assisting me with my survey work.

I thank my father (Late) Dr. Nirmalendu Mukherjee and mother Manju Mukherjee for their faith in me and their unending emotional support. I dedicate all the hard work to both of them and their never give up attitude towards life inspired me throughout this journey.

I thank my younger brother Akash Mukherjee for being extremely helpful in reviewing and proof reading my thesis, my niece Riya Biswas for assisting me in drawing the tables and figures; my father and mother in law – Sameep and Babli Chakraborty for their support, patience and prayers.

I extend a note of thanks to my fellow friends in Malaysia and Riyadh - Selva, Muniel, Dikshit, Asha and specially Hazwani for helping me in collecting data from the estates across Malaysia. I thank them from the bottom of my heart for the support, help, joy and laughter we shared throughout these years. I will forever remember and cherish it.

I am also very grateful to my dearest wife - Babita Mukherjee for being beside me throughout these years. Her love and support helped me to overcome all the challenges and hard times. Her smile and laughter gave me joy when I was in low spirits and the endless prayers and belief in me helped me to achieve the dream I was dreaming. I will

always treasure the love, support, joy, and remember the hard times we faced throughout this journey.

I certify that a Thesis Examination Committee has met on 30 May 2016 to conduct the final examination of Aroop Mukherjee on his thesis entitled "Sustainagility Model and Its Effects on The Malaysian Palm Oil Plantation Sector" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

Amin Mahir bin Abdullah, PhD
Associate Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Mohd Mansor b Ismail, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Azmawani binti Abd. Rahman, PhD
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Internal Examiner)

Ilias Vlachos, PhD
Associate Professor
University of Leeds
United Kingdom
(External Examiner)

ZULKARNAIN ZAINAL, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 26 July 2016

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Nitty Hirawaty Kamarulzaman, PhD
Associate Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Datuk Mad Nasir Shamsudin, PhD
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

Ismail Abd Latif, PhD
Senior Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

BUJANG BIN KIM HUAT, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software

Signature: _____ Date: _____

Name and Matric No. : Aroop Mukherjee, GS33938

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

Signature:	
Name of Chairman of Supervisory Committee:	Associate Professor Dr. Nitty Hirawaty Kamarulzaman
Signature:	
Name of Member of Supervisory Committee:	Professor Dr. Datuk Mad Nasir Shamsudin
Signature:	
Name of Member of Supervisory Committee:	Senior Lecturer Dr. Ismail Abd Latif

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

3Ps	People, Plant, Profit
AFC	Asian Financial Crises
AI	Agility Index
AVE	Average Variance Extracted
AVOC	ASEAN Vegetable Oils Club
BAU	Business-As-Usual
BDP	Best Developed Practice
CA	Cronbach's Alpha
CB-SEM	Covariance Based - Structural Equation Modeling
CEO	Chief Executive Officers
CFA	Confirmatory Factor Analysis
CICM	Chemical Industries Council of Malaysia
CIO	Chief Information Officers
CPKO	Crude Palm Kernel Oil
CPO	Crude Palm Oil
CR	Composite Reliability
CSPO	Certified Sustainable Palm Oil
CSR	Corporate Social Responsibility
DOE	Department of Environment Malaysia
EFA	Exploratory Factor Analysis
EID	Economic Industry Development Division
EIU	Economist Intelligence Unit
EMPA	East Malaysia Planters Association
EPP	Entry Points Project
ERP	Enterprise Resource Planning
ETP	Economic Transformation Programme
FELDA	Federal Land Development Authority
FFB	Fresh Fruit Bunches
FRGS	Fundamental Research Grant Scheme

GDP	Gross Domestic Product
GEM	Global Excellence Model
GHG	Greenhouse Gas
GNI	Gross National Income
GRI	Global Reporting Initiative
GTP	Government Transformation Programme
HCVF	High Conversion Value Forests
HQ	Head Quarters
IASC	International Association of Seed Crushers
IIRC	International Integrated Reporting Council
ISP	Incorporated Society of Planters
KMO	Kaiser-Meyer-Olkin
LV	Latent Variables
MBNQA	Malcolm Baldrige National Quality Award
MBPEP	Malcolm Baldrige Performance Excellence Program Criteria
MCAR	Missing Completely at Random
MEOA	Malaysian Estate Owners Association
MEOMA	Malayan Edible Oils Manufacturers Association
MIMIC	Multiple Indicators and Multiple Causes
ML	Maximum Likelihood
MNS	Malaysian Nature Society
MOE	Ministry of Education
MOMG	Malaysian Oleochemical Manufacturers Group
MOPGC	Malaysian Oil Palm Growers Council
MPOA	Malaysian Palm Oil Association
MPOB	Malaysian Palm Oil Board
MPOC	Malaysian Palm Oil Council
MPOD	Malaysian Palm Oil Directory
MPOI	Malaysian Palm Oil Industry
MPOPC	Malaysian Palm Oil Promotion Council
MS	Mean Score
MSPO	Malaysian Sustainable Palm Oil

NAFP	National Agro-Food Policy
NAP	National Agricultural Policy
NGO	Non-Governmental Organization
NGT	Nominal Group Technique
NIOP	National Institute of Oilseed Products
NKEA	National Key Economic Area
OER	Oil Extraction Rate
PDCA	Plan, Do, Check, Action
PLS	Partial Least Square
PLS-SEM	Partial Least Square - Structure Equation Modeling
POMA	Palm Oil Millers Association
PORAM	Palm Oil Refiners Association of Malaysia
PORIM	Palm Oil Research Institute of Malaysia
PORLA	Palm Oil Registration and Licensing Authority
QUAL	Qualitative
QUAN	Quantitative
R&D	Research and Development
RBV	Resource Based View
RGA	Rubber Growers Association
ROI	Return on Investment
RSPO	Roundtable on Sustainable Palm Oil
SAF	Sustainagility Assessment Framework
SAI	Sustainagility Index
SEM	Structural Equation Modeling
SI	Sustainability Index
SPSS	Statistical Package for Social Sciences
ST	Systems Theory
TBL	Triple Bottom Line
TOC	Theory of Change
TOS	Theory of Sustainability
UPAM	United Planting Association of Malaysia
UPM	Universiti Putra Malaysia

USFDA	US Food and Drug Administration
VIF	Variance Inflation Factors
VRIN	Valuable, Rare, Inimitable and Non-Substitutable
WWF	World Wildlife Fund

CHAPTER 1

INTRODUCTION

This chapter provides the background of the study along with Malaysia national key economic area. It highlights the issues and challenges that the Malaysian palm oil plantation sector (MPOPS) is facing with an intent to solve the issues practically and provide a strategic model to overcome the problems. Further, the chapter will list out the research questions and objectives to achieved, some of the issues, and provide the importance of the study along with the justification of selecting the Malaysian palm oil plantation sector and significance of the study.

1.1 Background

In a business environment, which is characterised by market stability and complex products, the dynamic response by an organization is a necessary precondition for the survival. The intensity with which an organization's response quickly to the changing market environments will depend on the capabilities to a greater extent across the members of the supply chain. Malaysia, an industrialized economy, desires to be a developed nation by 2020 (Dardak, 2015). The main sectors that contribute to the development of the country are manufacturing sector, agricultural sector, mining and service sectors and financial sector. The agricultural sector is an important sector and it promotes palm oil, which is one of the global edible oils and fats, supplies food and creates employment.

Malaysia is one of the rising economies of South-East Asia and is considered as an industrialised country. The majority of development banks is predicting to have strong economic growth in Malaysia. According to Malaysia Vision 2020, it will make the country a developed country and bring an economic revolution. Malaysia is known to be resource-rich country and began to adopt industrial evolution to be a manufacturing export structured economics (Sundram et al., 2011). As compared to other neighbouring countries, Malaysia economy has grown significantly with the results of government tenth Malaysia plan (10^{th} MP) and has identified eleven (11) sectors as National Key Economic Area (NKEA). Malaysia is being recognized as one of the most established export countries among the palm oil industry on the basis of the economy rise and as a major contributor to the country's gross domestic product (GDP). Thus, it has shown that the rising income and increase in manufacture superiority are because of the exceptional case of successful industrialization in a resource rich country (Best & Rasiah, 2003).

However, with the implementation of 10^{th} MP, Malaysia is focused on expanding the eleven sectors which will help in the development of the country with the contribution to GDP. The 10^{th} MP is strongly engaged in the implementation of the policies that concern the supply chain in the palm oil industry (Economic Planning Unit, 2012) and can be seen with the development of a New Economic Model (NEAC, 2010). This is possible with the availability of sustainable competitive advantages that have gained collaboration across the supply chain management.

The production and consumption of world's edible oils and fats have increased at the same pace in the last decades. Any difference between production and consumption indicates either an oversupply or shortage of the oils. The shortage of oils and fats happened in the year 1976 when the production was 45.9 million tonnes as compared to the consumption of 47.3 million tonnes, while there was an equilibrium in the year 2009 when the production and consumption were 163.9 million tonnes (Abdullah & Wahid, 2010b). Palm oil is one of the versatile oil, which is widely used as an ingredient for food and grocery products. The oil palm tree has the highest oil yield per hectare with lower fertilizer inputs and a production cycle of approximately 25 years. Palm oil is expected to make up 34-46% of the vegetable supply during 2010–2020F (LMC- Oilseeds Outlook for Profitability for 2020, 2009).

Malaysia has a diversified economic structure and competitive advantages in the palm oil industry over 100 years of experience with strong leaderships in terms of productivity and research and development (R&D). The Malaysian Gross National Income (GNI) receives fourth largest contributions from the Malaysian palm oil industry (MPOI). The Malaysian government has set an ambitious GNI target to RM178 billion by 2020 against the GNI contribution of RM52.7 billion in the year 2010 from the palm oil industry (Performance Management and Delivery Unit, 2012).

Thus, there has been a ten-fold increase in the global consumption of palm oil since 1980, which has been at 50 million tonnes per year with an expected increase of 50% growth by 2050 (Dawson & O'Gorman, 2013). In this respect, there have been changes in the mode of production and a shift in the focus for the entire supply chain wherein upstream encompasses the supplier and downstream towards the consumer. This made the supply chain management recognize an area enabling companies to gain a competitive advantage over competitors. Therefore, managing the supply chain effectively is a complex and challenging task. The complexity of the business environment could be due to the expansion of various products with ever demanding customers, shorter product life cycles with globalization and continuous advances in information technology (Lee & Xia, 2010). Indeed, the subject areas of supply chain management have proven that in this era of changing competition, the modern businesses no longer compete as autonomous entities, but as supply chains and the sustainable competitive advantage of an organisation influences the competitiveness of an organisation(Christopher, 2008).

Malaysia's palm oil industry is also the world's second-largest producer and exporter of palm oil after Indonesia and a global leader in the basic oleochemicals industry. Malaysia aims to boost palm oil industry's to outcome the gross domestic product (GDP) to RM21.9 billion, with RM69.3 billion in export earnings during the 10th Malaysia Plan period (2011-2015). The palm oil sector has contributed 9% to the GDP and accounted for RM49.6 billion of exports according to the Performance Management and Delivery Unit (2012). To achieve such targets, Malaysia is being promoted as a global hub for palm oil industry and a preferred destination for foreign investment as there are significant untapped opportunities to grow the palm oil industry in the upstream and downstream activities. In this regard, the Malaysian government is encouraging to have good agricultural practices, agronomic management and mechanization in terms of having centralized procurement of agriculture inputs such as fertilizers, pesticides, lower the cost of production and better supply chain.

The palm oil has recorded the fastest increase in global production and consumption, as the palm oil is the world's largest produced and consumed oil (Abdullah & Wahid, 2010b). The significant contributions by Malaysia and Indonesia in the production of palm oil as compared to other producing countries are detailed in Table 1.1.

Table 1.1 : World Oil Palm Production (000 Tonnes)

Country of Origin	1990	1995	2000	2005	2010	2015
Malaysia	6031	8264	11937	15485	18211	20500
Indonesia	2650	4850	8300	15560	23600	33000
Nigeria	600	590	730	800	850	970
Colombia	252	364	520	660	753	1130
Cote Dilvoire	278	304	248	236	300	415
Thailand	200	370	580	784	1832	2200
Ecuador	150	185	222	340	380	510
Papua New Guinea	145	223	336	310	582	580

(Source: MPOB, 2015; Oil World, 2015)

Malaysia and Indonesia produce approximately 86% of the world's palm oil (Figure 1.1) and the demand for palm oil has grown to an average 2.3 million tonnes annually (RSPO-Impact Report, 2014). Further, Malaysia exports 29% of the palm oil, whereas Indonesia exports 44% of the palm oil and the remaining 27% is exported by different countries of the palm oil producers (SSI Review, 2014) in Figure 1.2. The trends reflect that the global demand for certified palm oil will be double in five years from 5.3 million tonnes in 2014 to 11 million tonnes by 2020 (Cabel, 2015).

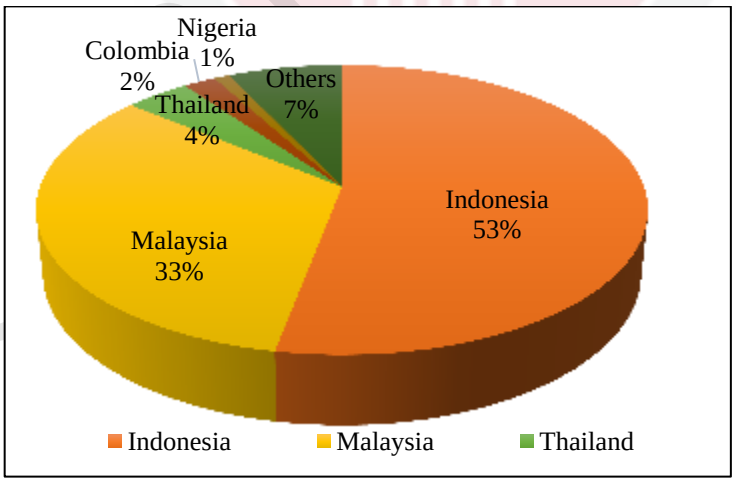

Figure 1.1 : World Palm Oil Production
(Source: RSPO-Impact Report, 2014)

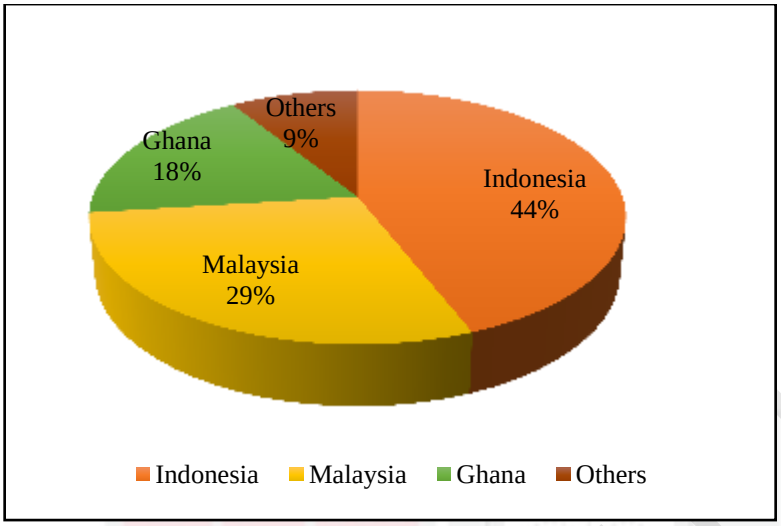

Figure 1.2 : World Palm Oil Exports
(Source: SSI Review, 2014)

The demand for palm oil has increased due to the wide applications and availability of the products. Thus, the major world exporters and importers of palm oil are shown in Table 1.2 and Table 1.3 respectively, and the projected palm oil production for the world till 2020 is shown in Table 1.4.

Table 1.2 : Exporters of Palm Oil ('000 Tonnes)

Country of Origin	1990	1995	2000	2005	2010	2012	2014
Malaysia	5433	6660	10579	13723	17151	18524	18000
Indonesia	1460	2082	4776	11696	16423	20373	22300
Cote D'Ivoire	128	106	1	119	227	235	275
Singapore	700	829	177	182	162	174	100
Papua New Guinea	146	227	309	362	577	564	640

(Source: MPOB, 2014; Oil World, 2014)

Table 1.3 : Importers of Palm Oil ('000 Tonnes)

Year	1990	1995	2000	2005	2010	2015
China	209	970	4000	2899	6661	9525
India	209	480	3300	3525	6603	5700
European Union	-	-	2885	4276	4944	-
Pakistan	777	1015	1295	1789	2064	3200
Egypt	365	390	499	468	1441	1500

Japan	304	348	382	494	570	600
Turkey	221	175	220	547	424	600
South Korea	214	173	213	227	284	450
Myanmar	150	140	220	304	390	850
USA	129	107	182	596	980	1135
Bangladesh	80	95	327	847	996	1400
South Africa	36	170	217	284	366	440
Saudi Arabia	170	190	200	278	273	320
Kenya	200	165	357	451	498	600

(Source: MPOB, 2015)

Table 1.4 : Projected Production of Palm Oil (2000 – 2020) ('000 Tonnes)

Five-Year Averages	Malaysia	Indonesia	World Total
2001-2005	11,066 (47.0%)	8,327 (35.4%)	23,530
2006-2010	12,700(43.4%)	11,400 (39.0%)	29,210
2011-2015	14,100 (40.2%)	14,800 (42.2%)	35,064
2016-2020	15,400 (37.7%)	18,000 (44.1%)	40,800

Note: (%) = % of world total
(Source: MPOB, 2014; Oil World 2020, 2014)

1.2 National Key Economic Area (NKEA)

The National Key Economic Area (NKEA) (2010-2020), is driven with the Vision 2020. According to Vision 2020, the country projection is to generate RM1.7 trillion gross national income (GNI) with 11 industry sectors and Greater Kuala Lumpur / Klang Valley (Figure 1.3) as a National Key Economic Area (NKEA), where palm oil industry is to be one of the contributors to the Malaysian economy and to reinforce the private sector for better investment and productivity with eight entry points project (8EPPs). The palm oil industry has changed the Malaysian economy and plays an important role in achieving Vision 2020. However, earlier to NKEA the Malaysian government had agricultural policy in place. The First National Agricultural Policy (NAP1) (1984-1991) emphasized on the expansion of agriculture land, especially for oil palm and the major investment was in infrastructures and new land development schemes in order to plant more oil palm and to increase foreign exchange, to generate employment and to fight rural poverty. The Second National Agricultural Policy (NAP2) (1992-2010), emphasized on increasing the productivity, efficiency and competitiveness in the context of sustainable development and private sector was given a bigger role to play in terms of food production, marketing reforms and conservation of sustainable natural resources. However, due to the liberation of the agricultural trade and financial crises in 1997, there was an effect on the stability and security of Malaysian food supply and thus it did not anticipate such changes in the domestic and international economy. The Third National Agriculture Policy (NAP3) (1998-2010), which was actually a revised version of NAP2, where new strategies and policy were highlighted in order to meet the national objective for agricultural development for

better productivity, private sector investment in agriculture, enhancing exports and reducing unproductive export and sustainable use of natural resources, so as to transform small-scale production based sector into a large based scale agribusiness industry and makes a significant contribution to economic growth and sustainability.

Figure 1.3 : National Key Economic Area (NKEA)
(Source: Economic Transformation Programme, 2010)

The palm oil is going to be the major contributor to the Malaysian economy. The palm oil NKEA targets to raise gross national income (GNI) contribution of RM125 billion to RM178 billion by 2020 with the addition of jobs of 41,000 of which 40% will be high-skilled jobs with an average monthly income of RM6,000 will be created. Thus, the key focus on Palm Oil National Key Economic Area (NKEA) is to reinforce the leading role of the private sector in directing the palm oil industry.

As the palm oil industry is planning to raise RM178 billion contribution to GNI by 2020, the Economic Transformation Unit, Malaysia has laid down eight core entry point projects (EPP) to bridge the GNI gap across the value chain. The 8 EPPs (Table 1.5) are clustered into two segments (i) upstream productivity and sustainability and (ii) downstream expansion and sustainability. The five EPPs focus on improving the upstream productivity and sustainability and whereas the remaining three EPPs focus on downstream expansion and productivity. With the Vision 2020, the five EPPs would

like to generate and incremental GNI of RM33.1 billion, with the productivity improvement of 25% (21 to 26.2 tonnes per hectare per year) of FFB yield by 2020 (Performance Management and Delivery Unit, 2010).

Table 1.5 : 8 Entry Point Projects (8 EPP)

Entry Point Projects	Upstream Productivity and Sustainability	Projected Plan
EPP 1	Accelerating the replanting of oil palm	Will generate and additional GNI contribution of RM4.6 billion in 2020.
EPP 2	Improving fresh fruit bunch yield	Will generate RM10.2 billion of incremental GNI, create an additional 1,600 jobs and improve the annual income of 161,000 independent smallholders by 47%.
EPP 3	Improving worker productivity	Will generate an estimated RM1.7 billion in GNI by 2020 and create 28,000 local jobs (in addition to reducing 110,000 foreign workers).
EPP 4	Increasing the oil extraction rate	Will generate an additional RM13.7 billion in GNI and create 10,000 local jobs, mostly due to the opening of 84 new mills to meet the increased the supply of FFB in 2020.
EPP 5	Developing biogas at palm oil mills	Will generate an estimated RM2.9 billion in GNI in 2020 while creating 2,000 jobs and not required any incremental government funding.
Entry Point Projects	**Downstream Expansion and Sustainability**	**Projected Plan**
EPP 6	Developing oleo derivatives	Will generate an additional RM5.8 billion in GNI and create 5,900 local jobs.
EPP 7	Commercializing second generation biofuels	Will generate RM3.3 billion in additional GNI and create 1,000 local jobs.
EPP 8	Expediting growth in food and health based downstream segments	Will generate RM4.9 billion in additional GNI and create 74,900 local high-skilled jobs.

(Source: Economic Transformation Programme, 2010)

The Malaysian palm oil industry (MPOI) extends across the entire value chain from upstream activities (plantations) to downstream activities. The development of the industry is heavily skewed towards upstream activities with the production of fresh fruit bunches (FFB) in plantations and processing of FFBs to produce palm oil and palm kernel oil, however, the government is primarily targeting the downstream activities and supporting the independent smallholders (Performance Management and Delivery Unit, 2010).

The palm oil industry is dominated by large plantation companies such as government-linked companies (24%) and private companies (62%), which hold total plantation land with a growing level of integration along the value chain and share of 14% are under the ownership of smallholders and independent holders (Figure 1.4). The Malaysian palm oil industry is expected to grow by 7.1% over the next ten years with the baseline being 2010 (Performance Management and Delivery Unit, 2010). The growth of the industry is to be driven by the factors such as an increase in the average productivity of FFB, which is at present 21 tonnes per hectare per year and the oil extraction rate (OER), which is at present 20.5%, and replanting of the oil palm tree by creating new land for plantation of about 4.7 million hectares, almost 71% of the total land used for oil palm plantation in Malaysia. The productivity gains in the palm oil industry shall have a significant impact on GNI growth. The growth potential in both FFB yield and OER is significant due to the high level of variation in performance between large, medium, and small plantations and smallholders in Malaysia.

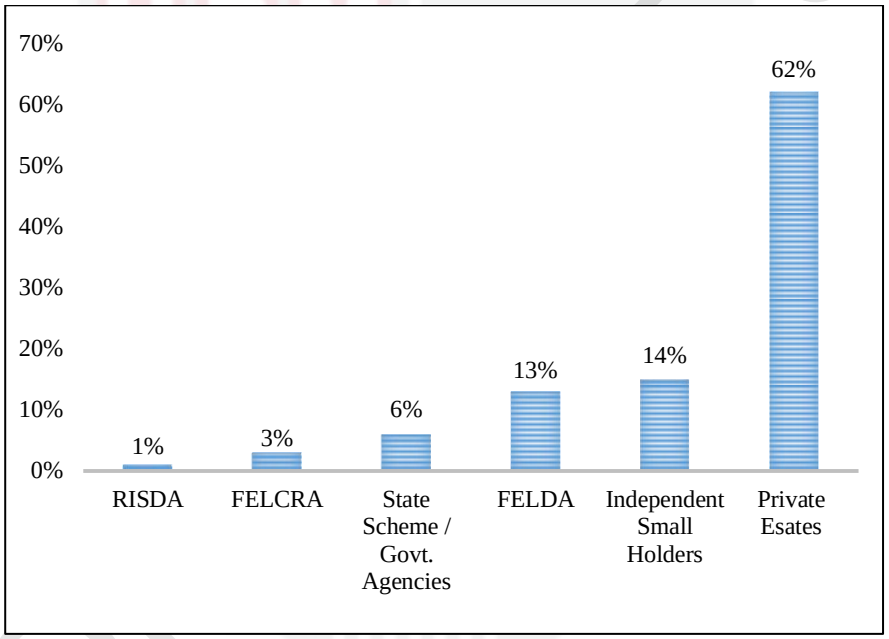

Figure 1.4 : Distribution of Plantations Companies
(Source: MPOB, 2015)

The Malaysian palm oil and palm kernel oil have a wide range of applications, and about 80% is used for food production and the remaining is used for non-food production (Salmiah, 2000). Palm oil is made up about 30% of the global vegetable oil consumption as compared to soybean oil (23%), rapeseed oil (13%), sunflower oil (7%) and others (27%) (Figure 1.5 and Table 1.6). Approximately, three-quarters go into the production of food items, and the remaining goes into the industrial products such as chemicals, cosmetics, biofuel and animal feeds. The demand for vegetable oil has been predicted to be double between 2010 and 2050 from 120 million tonnes to 240 million tonnes annually and with respect to palm oil, it is projected to have a demand of 75 million tonnes by 2050.

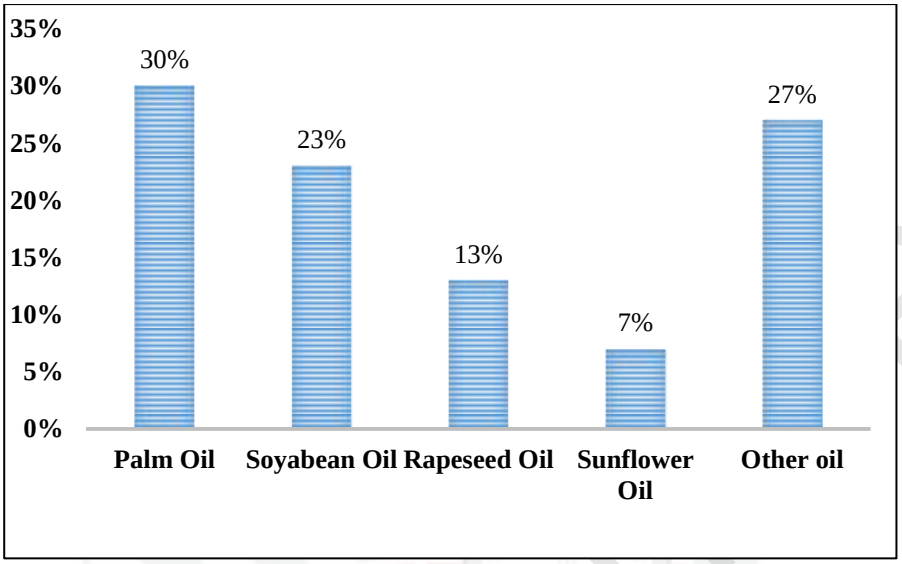

Figure 1.5 : Consumption Palm Vs. Other Oils
(Source: MPOC, 2014)

Table 1.6 : Type of Vegetables Oil (Production per hectare)

Oil Crop	Production (Million Tonnes)	% of Total Production	Average Oil Yield (Tonnes/Hectare /Year)	Total Area(Million Hectare)	% Area
Soybean	41.75	22.54	0.40	103.88	40.26
Sunflower	14.92	8.06	0.58	25.83	10.01
Rapeseed	24.21	13.07	0.73	33.28	12.90
Oil Palm	66.96	36.15	4.73	14.14	5.48

(Source: MPOC, 2014; Oil World, 2014)

The Malaysian Palm Oil Board (MPOB) which is a government body, is responsible for policy making and research and development (R&D). The MPOB has indicated that the maximum planted area in Malaysia is 5.6 million hectares, which means that Malaysia is left with only 600,000 hectares of land for future expansion. As per the Malaysian government policy, at least 50% of the country land should be kept as forest or perhaps more. Hence, there is a very little land is available for sustainable developments for palm oil plantations.

As palm oil is the highest yielding vegetable oil crop in the world, both Malaysia and Indonesia have been using the seeds of oil palm that are of Tenera hybrid type of the majority of oil palm until the recent development of high yields were successfully developed. The best yielding seeds can produce seven to eight tonnes of palm oil per hectare and are being used internally for higher production and for trying to meet the demand of the edible oils worldwide.

The Malaysian palm oil annual production increased significantly with sudden expansion of the planted area. The crude palm oil (CPO) produced in 2014 was 19,667,016 million tonnes and which was increased to 13.5% as compared to 2010 (Table 1.7). The increase in production of CPO in Sabah was particularly impressive and reflecting the planting policy in the state that will become the largest CPO producer.

Table 1.7 : Production of Crude Palm Oil in Malaysia (Tonnes)

Region	1980	1990	2000	2010	2014
Peninsular Malaysia	2,394,324	6,094,622	7,221,539	9,498,120	10,172,108
Sabah	156,471	678,995	3,110,320	5,315,996	6,055,569
Sarawak	22,378	107,651	520,236	2,179,601	3,439,339
Total	**2,537,173**	**6,881,268**	**10,852,095**	**16,993,717**	**19,667,016**

(Source: MPOB, 2015)

1.3 Issues and Challenges in the Malaysian Oil Palm Industry

In the present scenarios, there is a growing global demand for palm oil that has driven the development of vast plantations with positive and negative impacts on key growing countries in South-East Asia and also in the West Africa and Latin America. The recent increase in palm oil exports has undoubtedly resulted in economic growth and job creation, but the expansion of oil palm plantations has led to deforestation, destruction of habitats and release of vast amounts of carbon dioxide into the atmosphere. Due to this, the greatest challenges the plantations are facing is to increase its yields per hectare in order to meet the demand for food by the growing world (Weng, 2005) which is currently seven billion and is projected to reach nine billion by 2050 (Figure 1.6).

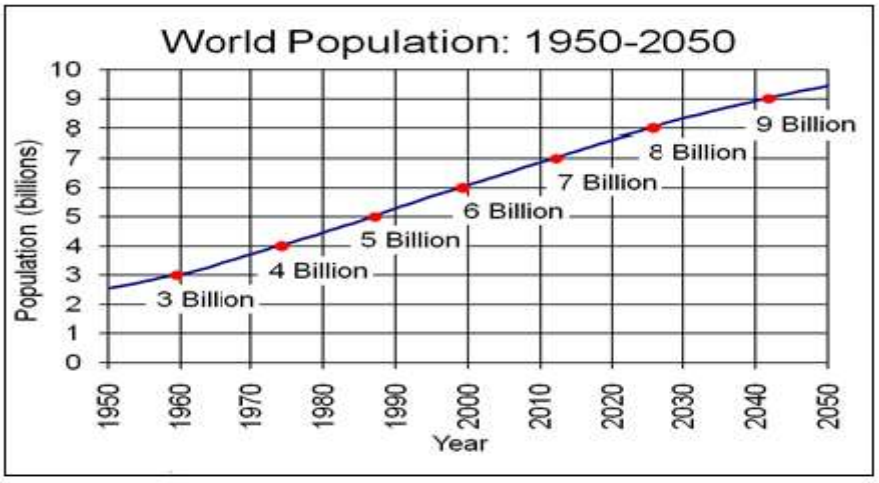

Figure 1.6 : World Population
(Source: U.S. Census Bureau, International Data Base, June 2011)

There are 15 million hectares of palm oil plantations in the world and is estimated that an additional 12 million hectares are required to meet the demand. As the world population is increasing, there is a huge demand for palm oil production to be increased from 45 metric tonnes in the current position to 63 metric tonnes in 2015 and 77 metric tonnes in 2020 (WWF-Malaysia, 2012). While considering the sustainable production and use of palm oil is based on the sustainable development with better lean practice, better agility implementation, good governance, better strategic management practices and 5S which is workplace organisation method that uses five Japanese words which are translated into English as Sort, Set in order, Shine, Standardize, and Sustain. Table 1.8 shows challenges under the economic, social and environmental aspects and governance (Teoh, 2010).

Table 1.8 : Challenges of Palm Oil Industry

Aspects	Challenges
Economic	• Yields gaps • Declining prices and rising costs • Poor uptake of Certified Sustainable Palm Oil (CSPO)
Environmental	• Deforestation • Loss of biodiversity • Climate change • Use of pesticides and fertilizers
Social	• Indigenous peoples and local communities • Smallholders • Lack of transparency • Plantation workers • Security issues

(Source: Teoh, 2010)

The Malaysian palm oil industry is facing strong competition from its neighbouring country, Indonesia in terms of CPO production. Indonesia has performed significantly well since 2000 in terms of CPO production. Figure 1.7 shows the downtrend in terms of CPO production from 2006 onwards, and Malaysia has lost the first position from Indonesia in CPO production, whereas Indonesia is shown protruding upwards in a straight line and in 2010-2011 trend shows an increase in the production.This is also due to land availability and good infrastructure which shows a great chance for Indonesia to have better production growth momentum in the short-term (Abdullah & Wahid, 2010b). Further, MPOI faces substantial challenges in the business environment in terms of cost of production, productivity, and maturation and production of the product resources.

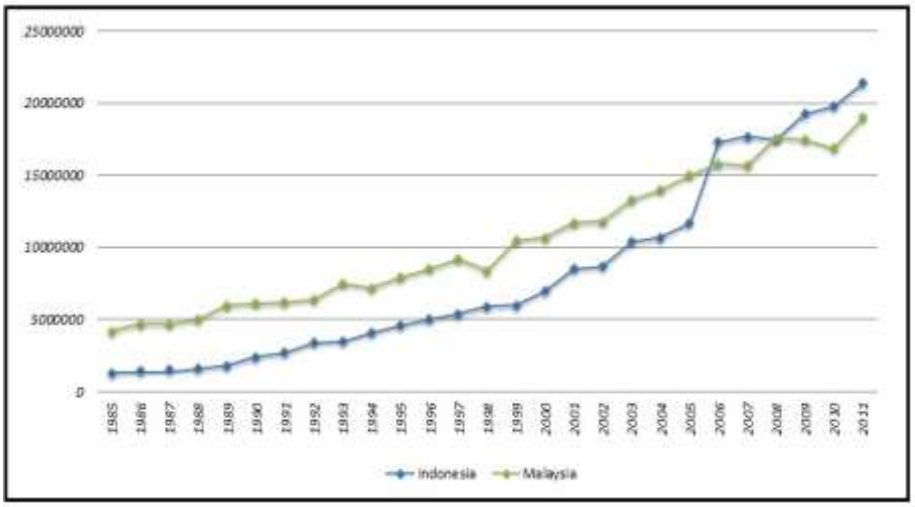

Figure 1.7 : Malaysia and Indonesia Palm oil production 1985-2011 (metric tons)
(Source: Prokurat, 2013)

In addition, FFB yield during the year 2011-2015 has shown flactuation from 19.69 tonnes per hectare to 18.48 tonnes per hectare and the national oil extraction rate (OER) in 2015 declined by 0.8% to 20.46% from 20.62% in the previous year and such decline is mainly due to lower quality of FFB processed by mills shown in Table 1.9.

Table 1.9 : FFB Yields and Oil Extraction Rate

Year	Yields (Tonnes/Hectare)	OER (%)
2015	18.48	20.46
2014	18.63	20.62
2013	19.02	20.25
2012	18.89	20.35
2011	19.69	20.35

(Source:MPOB, 2015)

Malaysia is one of the fastest growing economies in the Southeast Asia and Asia Pacific region. Malaysia's economy in 2014-2015 is one of the best competitive and ranked 6th in Asia. In 1991, the former Prime Minister of Malaysia Tun Dr. Mahathir Mohamad laid down the Vision 2020 to make Malaysia as a self-sufficient industrialized nation. The current Prime Minister of Malaysia Dato Sri Mohammad Najib Razak has conceptualized two programs such as Government Transformation Programme (GTP) and the Economic Transformation Programme (ETP) for the Vision 2020.

1.4 Problem Statement

Malaysia was once the largest producer of palm oil in the world. But, due to diversifying into manufacturing sector, which helped in the country's economy and also with less production of palm oil lead Malaysia lost its position and become the second largest producer of palm oil in the world after 2008. Due to the scarcity of land availability and the land policy there have been slow production of palm oil in Malaysia, mostly in Peninsular Malaysia. However, the national land area under oil palm has increased from 4.67 million hectares to 5.4 million hectares due to the opening of large tracts of land for oil palm cultivation by the Sarawak state government (Ong, Teh, Lau, & Wong, 2010). However, according to Datuk Sabri Ahmad (chairman, MPOB) and Mr Chandran from Malaysian Palm Oil Association (MPOA) stated that Malaysia lost its top position to Indonesia because of less availability of land and labour. In order to achieve an increase its output, Malaysia Palm Oil Plantation sector (MPOPS) needs to manage namely,1) either increase the land area for the development of oil palm cultivation and be sustainable or increase the yields with the existing oil palm plantation and 2) to have consistence in the skilled labour force.

Previous studies have revealed that the key challenges that continue to confront the Malaysian palm oil commodity industry are declining overall yields with respect to the rising cost of production, pest and diseases, constraints in human resource, talent management, managing socio-environmental issues, and the Roundtable on Sustainable Palm Oil (RSPO) or Malaysian Sustainable Palm Oil (MSPO) certification. The issues relating to sustainability need to be considered more independently with an appreciation of the importance of palm oil in the coming years to ensure palm oil supply is adequate for global needs (Yee, 2012).

These days business groups are facing tough competition and pressure from Roundtable on Sustainable Palm Oil (RSPO), Malaysian Palm Oil Board (MPOB), NGO's, governments, and an individual group of society for environmental and social sustainability to increase palm oil production in a sustainable method. In the last decade, widespread efforts to promote greater sustainability across a range of agricultural supply chains, including palm oil were made due to growing concern about the rising global population and food security (Nagiah & Azmi, 2012). Often improvements in sustainability are implemented through the establishment of an RSPO (Nagiah & Azmi, 2012) or Malaysian Sustainable Palm Oil (MSPO) certification system that sets voluntary standards for producers and provides assurances to consumers. However, the palm oil producers are finding it difficult to obtain RSPO certification for various factors such as limited awareness of new technologies, innovation, organizational learning, best practices and lack of financial resources to meet the costs of certification.

A study conducted jointly by Dutch development bank, World Wildlife Fund (WWF) and Britain's development finance institutions showed that firms that have certifications of RSPO have gained a significant return on their investments. Thus, to have significant gain and to place the organisation to manage the top and bottom lines as aggressive as possible, agility will be able to respond to continuously changing market conditions (Karim, 2013). Such that more agile the organisations, the

organisations tend to have better ability to support the productivity and is, therefore, likely to gain the most benefits out of it in Malaysia (Lee, 2014).

The Malaysian Palm Oil Industry (MPOI) is able to play an important role in the Malaysian economy for several decades, it is due to flexibility according to Chairman of Genting Plantation Tan Sri Mohd Zahidi Bin Hj Zainuddin (2012). Even flexibility contributes to sustainability as it aims to increase efficiency, productivity, and reduce engineering effort and costs. Such changes do incur costs, but a balancing act occurs in the form of lowered ecological impact. De Neufville et al. (2005) alleged that flexible design may be more attractive to investors though it may have a risk-reward profile than an inflexible system. Thus, flexible strategies address the future uncertainty at the policy stage and help to achieve sustainability goals.

However, in moving ahead while the economic climate may turn and shift the fundamentals is to notice the agility, and is not only to overcome the challenges but to turn the difficulties into opportunities (Genting Annual Report, 2011). However, the industry core values is protected with flexibility in nature and how well the industry respond to change with agility with a cost effective mindset to have constant pursuit of excellence (IOI Annual Report, 2015). Thus, agility plays a vital role in being able to adapt and survive (Dixon, 2010). Nevertheless, agility also brings its own risks. The more agile and responsive the organization, the more forethought the organization needs to be and possess in-depth knowledge of understanding of the wider market. Otherwise, organization's agility may lead to rash decisions. A concurrent innovation has been a common feature in such companies. Progress in one area triggers changes elsewhere, and provides new resources for a third area (Rapid Innovation, 2012).

Flexibility is often aimed at improving efficiency, productivity, and reducing the engineering effort and costs. These contribute to sustainability endeavours as well. According to De Neufville et al. (2005) a flexible design will have a different risk-reward profile than an inflexible system, and thus it is more attractive to investors. Flexible designs help to advance sustainability goals by specifically addressing future uncertainty at the design stage.

The essences of sustainability are not simply another corporate motto or set of compliance principles rather to lie on the core of how we do business to care and respect for the environment and society. The major aspect of sustainability is to minimize the potential negative effects and to foster positive benefits for all the stakeholders. To manage sustainability, the business environment is facing the competitiveness among the internal and external players. In the agricultural sector, the competitiveness of the sector must incorporate sustainable agricultural systems that promote equal farming profits, agroecosystem, and product attributes (Shamsudin, 2008).

It is also believed that to achieve sustainability it requires necessary steps to implement organizational learning in the organization. Learning and development process have been considered an important way to attain sustainability (Muller & Siebenhuner, 2007). With the increasing demand for sustainable product and services, MPOI needs to place them in a better position to demonstrate the ability to deliver sustainable palm oil. Such ability is to solve some of the world's most complex sustainability challenges which are rapidly evolving business innovations, applications, methods, products, and

processes adapted to change. A roadmap for sustainable business success in profitable and rapidly growing markets is waiting to be exploited by agile teams, which will be able to move faster and adopt new methods with the roll out new technologies. Agility serves as the underlying paradigm to enable an organization to reinvent their competitive strategy in the current intense competition industry in the world.
However, with this advent of combining agility and sustainability will help the MPOI to be global leaders. Dixon (2010) has articulated with the business leaders to know about agility and sustainability issues like the corporate image, the growth of emerging market, transport trends, innovation and agile organization to identifying risks and maximize opportunities. The future prospect requires preparation for uncertainty and quick and agile adaptation, given the rapid pace of change that has the importance of developing strategies for the organizations (Jackson et al., 2010). Organizations planning to be benefited from the opportunities with the unstable conditions will have to design strategies that build in agility and sustainability.

Agility and sustainability i.e. sustainagility can certainly reduce the environmental impact as well as property related costs, but also improve service flexibility, business and individual productivity, customer focus, and create better job environment. Hence, organizations need to learn to become flexible, dynamically adapt and become more sustainable and interdependent within the dynamic non-equilibrium of an ever-changing economic market. The focus now has shifted to how well the MPOI meets the universally accepted standards for sustainability and be more agile including the RSPO (Basiron & Sundram, 2012). As the companies become aware of environmental issues, there is a need for ecological products.

Techno-organization dynamism is an amalgamation of innovations, organizational learning, and competitiveness technologies which is being proposed in this study. Techno-organization dynamism is defined as an ability to react randomly and faster ways in which innovation and knowledge sharing, can change the strategic planning, and increase its competitiveness in the business environment. The development of new concepts of techno-organizational dynamism is grounded in the relationship between the technologies. The framework of the techno-organizational dynamism is to position the changes that will specify to have influenced the changes randomly and being more agile. The importance of techno-organisation dynamism is based on two streamlines (i) the features of innovation, organizational learning, and competitiveness which influence the state-of-the-art development methodologies for the development of sustainagility as the controlling technologies in the decision-making process at the strategic level; and (ii) the combination of standards and theoretical methods of techno-organizational dynamism designed to have experimentation and development framework for the development of the best method for sustainagility.

However, MPOI still faces issues related to low productivity, rising production cost and foreign labour dependency in upstream activities despite such achievements. Hence, if the organisation has an effective supply chain which is sustainable with long-term competitiveness and is innovative, the organization would be sustainagility (Dixon & Ross, 2011). The sustainagility in the supply chain is a standard for the relationship with both upstream and downstream in creating and attaining the higher productivity and the leverage in the impact of people on the technology.

This study is an attempt to understand the effects of sustainagility model to make the organization to be sustainagile which will also test the impact of the organization in the competitive situation. The model will provide new empirical evidence, the importance of flexibility in predicting the effect in the sustainagility model and streamline with techno-organization dynamism. Based on previous studies, it was found that mixed method research is used frequently in the social scientific study to overcome the weakness of one methodology to another such as quantitative to qualitative and vice versa to have unbiased outcomes. The study provides an insight to the resource-based view (RBV), systems theory (ST), theory of sustainability (TOS) and theory of change (TOC). Therefore, in understanding the relationship between agility, flexibility, sustainability, techno-organization dynamism (innovation, competitiveness and organizational learning) and sustainagility with respect to the Malaysian palm oil plantations will contribute in understanding the relationships. This study also contributes in creating sustainagility matrix and a score card for the organization to verify where the organization is placed to be sustainagile.

1.5 Research Questions

In order to achieve the aims of the research, it is important to address the research questions. The concept of agility and sustainability can lead to the development of sustainagility assessment model. Therefore, this research has identified the questions as follows:-

1. What are the variables and key factors that are significant to determine the organization to be sustainable and agile?
2. Which of the items is associated with the key factors and constructs to make the organization sustainagile?
3. How index (agility, sustainability, and sustainagility) can be assessed and how one can assist in achieving and enhancing sustainagility effectively?
4. What dimensions of agility, sustainability, flexibility, and techno-organisation dynamism will influence to have sustainagility model?
5. How do agility and sustainability will influence sustainagility?
6. How flexibility will be an important aspect for sustainagility?
7. Does flexibility mediate the relationship between agility, sustainability, and sustainagility?
8. Does techno-organization dynamism moderate the relationship between flexibility and sustainagility?

1.6 Research Objectives

The general objective of this study is to investigate the effect of sustainagility model in the upstream of Malaysian Palm Oil Plantations. The specific objectives establish for this study are:

1) To determine and develop the latent constructs and verify the items associate with key factors that are significant to determine the organisation to be sustainagile.
2) To calculate the index in achieving and enhancing sustainagility.

3) To determine the factors of agility, sustainability, flexibility and techno-organisation dynamism that will influence sustainagility.
4) To investigate the relationship between agility, sustainability and importance of flexibility that influence sustainagility.
5) To investigate the mediating effect of flexibility on agility, sustainability and sustainagility.
6) To investigate the moderating effect of techno-organization dynamism on agility, sustainability, flexibility and sustainagility relationship.

1.7 Scope of the Study

Malaysia Palm Oil Industry (MPOI) desires to achieve the first position in the global market with higher market share from the other neighbouring countries. Thus, the aim of this research was to develop the sustainagility assessment model in the context of the Malaysian palm oil plantation sector (MPOPS). The research is different from the previous studies of this phenomenon due to the study of agility and sustainability in a single study in the customary supply chain. Furthermore, the majority of prior studies on agility was conducted in the manufacturing sector. Sustainagility as a new concept in the palm oil industry, will sheds light on and provides new insights into sustainagility into the upstream process in palm oil industry supply chains.

However, the model development for MPOPS is in the context to develop measuring systems that can identify the industry to be sustainagile. One of the key elements for the development of the model is to provide a standard notion for an industry being sustainagile by measuring the elements which are brought together. The practical research questions that are addressed is to provide recommendation to the situation of the palm oil industry which indeed needs to integrate the concept of agility and sustainability and to make the industry be sustainagile. The assessment of using the model will help to develop the optimization process for the industry to be competitive and to create a scorecard and a matrix that will help the organization to identify what steps should be taken to be sustainagile. It is likely that a standard level of measurement shall be created for the industry to measure in a mixed method approach, which is necessary for the various objectives for the study.

Thus, the scope of the study will constitute agility, sustainability and the development of the model for sustainagility in the plantation estates of palm oil in Malaysia and the development of sustainagility model for the upstream in the MPOI. The study will also calculate the agility, sustainability and sustainagility indexes and develop the criteria range for the industry to be sustainagility. The mediation and moderation effect of the industry is to be flexible and techno-organisation dynamisms to be sustainagility. Therefore, to develop the model and test the sample population is with the oil palm plantations and organization registered with the Malaysian Palm Oil Board (MPOB) which are provided in the directory of 2014.

The research work is focused on organizational basis and not on an individual basis, which means the area of study of the research covers the perception of all managers' level from lower manager to the top management level who are representing an organization or oil palm plantations in the area of supply chain management, sustainability, operations and other related areas.This cross-sectional study involved

sampling and data collection for the period of 19 months, starting from the date of September 2013 till April 2015. Cross-sectional study involved data collection at a defined time from the expert in the first stage and later from the plantation managers across all the levels. Therefore, the overall aim of the research was to study the factors, calculate the index and develop model to the underpinning development of a sustainagility assessment model in the Malaysian palm oil industry in the upstream cluster.

1.7.1 Selection of Malaysian Palm Oil Industry (MPOI)

The Malaysia palm oil industry (MPOI) has changed Malaysia into a profitable realm in tropical agribusiness. The Malaysian Palm Oil Council (MPOC) claimed that the MPOI has made significant progress in environmental management in the last 4-5 years by executing and implementing laws and strategies that focus on sustainable development (Chin, 2009). Sustainable development is being accepted across the world as the most competent ways of addressing the social, economic, and environmental issues. The palm oil industry will be an important aspect of the Malaysian economy with the industry projected to contribute RM200 billion to Malaysia's export value by 2020 which would be three times higher than the current value. As the Malaysian palm oil industry (MPOI) is a challenging industry, it is revealed that there is a possibility of expanding the MPOI to a great extent to boost the resource-rich exporting economy (Economic Planning Unit, 2012). However, with the commitment by MPOB, MPOC and other stakeholders, the MPOI needs success from the efforts that depend on the strategies and the development of upstream and downstream and becoming internationally competitive. As there has been relatively little research effort committed towards sustainagility concepts in the body of knowledge, the choice of this industry was considered appropriate for this research.

1.7.2 Selection of research area as supply chain and sustainability

The industry consists of interrelated business activities that operate along the supply chain and would require a better approach in their supply chain management. Supply chain management helps in optimizing the operation to maximize speed and efficiency. As the customer is looking for fast and better service which can increase cost, it is better to maximize the efficiency to equally important. The effective supply chains will deliver products as fast and as cheaply as possible without sacrificing quality. The better supply chain will provide a way to develop a competitive advantage without lowering the price, and efficient supply chain will also have cost benefits. The better supply chain will increase the negotiating power by collaborating with the different business entity. In the business scenario, it is difficult for small businesses to have an effective and efficient manner of running the business, but proper supply chain management will help such business to optimize the profits and reduce the risk of proper delivery times and lower costs.

Supply chain management manages to handle major issues which include the rapid growth of multinational corporations and strategic partnerships, global expansion and sourcing, and environmental concerns. Due to this, the supply chain is the most critical business discipline in the world. With a well-defined activity of the supply chain, it

manages to create jobs and decrease pollution. The impact of the implementation of the supply chain on the business is significant which has given a boost to the service and improved the process to be streamlined for day-to-day activities. The implementation of the supply chain will diagnose the problems and consider the longterm importance for the industry and manufacture sustainability. The reason for the industry to become interested in sustainability is due to good business practices.

The industry that practices sustainability strategies along with supply chain strategies is getting greater profits and creating their own consumer base. Implementation of sustainability strategies helps the industry to be more competitive and force the industry to innovate and create new solutions that can drive to provide better products and gain profits. Sustainability will help to create new demands and markets from the business. This shows that the industry will improve its competitiveness in the industry. Thus, this study is to bring about a sustainagility model for the Malaysian palm oil plantation sector in the supply chain.

1.7.3 Selection of upstream segment in the study

The supply chain in the palm oil industry is classified into upstream and downstream. The Malaysia palm oil industry contributes to 74% in terms of oil exports, whereas the downstream contributes to 17% in 2013 (Khaoo, 2014). The palm oil sector is being driven by an upstream segment more as compared to the downstream segment (MPOB, 2014). Thus, the key industries that depend on palm oil derivatives it is important for them to produce fresh fruit bunches (FFB) as raw materials in a sustainable manner (Khaoo, 2014). Further, it is necessary to strengthen the upstream activity and the linking between upstream and downstream to make the downstream internationalise value-added activities (ETP-BL, 2014). Based on NKEA, it is aimed to increase the productivity with the focus on sustainable development, and the target is to achieve 6 metric tonnes per hectare. The increase in productivity will boost the downstream activity and also focus on sustainable development. In order to make the downstream and other derivatives of MPOI to be sustainable, is to increase productivity and competitiveness of upstream activity. Thus, the upstream segment has been chosen for this study.

1.8 Sustainagility model for Malaysia Palm Oil Plantation

The sustainagility model for Malaysian palm oil plantation is due to improve the measuring systems that can identify the plantations to be sustainagile. One of the key elements of the model is to provide a standard notion for the plantations to be sustainagile by measuring the elements which are brought together. The practical research questions that here addressed is to solve the situation of the palm oil plantations was needed to integrate the concept of agility and sustainability and to make the industry be sustainagile. The evaluation of using the model will help to develop the optimization process for the industry to be competitive and to create a scorecard and a matrix that will help the organization to identify what steps should be taken to be sustainagile. It is likely that a standard level of measurement shall be created for the industry to measure in a mixed method approach which is necessary for the various objectives for the study.

1.9 Organization of the Thesis

This thesis is organized into six chapters. The summary of each chapter is presented graphically in Figure 1.8 and followed by a description of each chapter. Figure 1.8 shows the overall outline of the thesis organization.

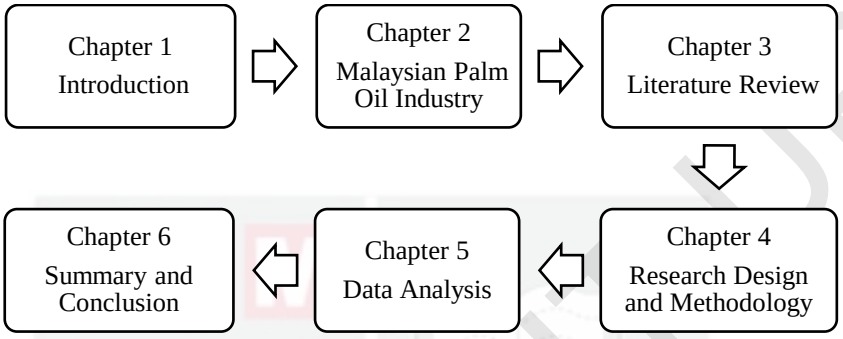

Figure 1.8 : Outline of the Thesis Organization

Chapter 1 briefly discusses the background and scope of the research. This chapter also provides the research questions, research objectives and the justification of selection of industry and area concerns for this study. Lastly, the chapter provides the outline of each chapter in the study.

Chapter 2 discusses the development of palm oil industry in Malaysia. The historical background of the sector is provided with a focus on its evolution, along with the description of upstream and downstream activities. This chapter looks at the various aspects of agility and sustainability practices in the industry and its importance.

Chapter 3 deals with the review of the literature and with the theoretical contribution used in this thesis. The chapter will highlight the development of the sustainagility assessment model (SAM). Therefore, to understand the theory development, this chapter will help to understand the theory used. The process of developing a theory in this study involves the study of existing theory, such as resources-based view (RBV), systems theory (ST), theory of sustainability (TOS), and theory of change and the framework proposed for the development of the model. The chapter details the most of the aspects related to the sustainagility model. Thus, the chapter presents the discussion on the study of various constructs used in this study.

Chapter 4 presents the detailed aspect of research design and methodology. All procedures in the research design such as philosophical base, sampling procedures, identification of target population, sample size, procedures for the development of measuring items are discussed. Furthermore, the chapter reveals the data collection, data processing and data analysis techniques.

Chapter 5 discusses the detailed analysis and result of the survey data. The chapter presents the results of the survey conducted during fieldwork in Malaysia the respondent's profile, company profile and tests for similarities or differences in

responses. The results of the quantitative analysis performed using factor analysis and confirming the factor along with multiple regression and structural equation modeling of the relevant data. The academic discussion is linked to the main research findings by providing answers to the postured earlier on the research. Furthermore, this chapter deals with the case study analysis as a form of triangulation method.

Chapter 6 concludes the research report by pointing out the implications for the practical and theoretical aspects. This chapter also discusses the limitations encountered in the course of doing the research. It presents the suggestions on areas for future research on the subject of study and provides the concluding remarks on the research. Finally, this chapter ends with a presentation of recommendations to the various stakeholders in the area of supply chain management, system theory and change management, in particular the palm oil industry in Malaysia and those vested with the task of promoting this sector for the development of the country to achieve Vision 2020.

1.10 Summary

This chapter provides a clear, concise understanding of problems. The success of identifying the gap of the study is underlined comprehensively through its problem statement in the Malaysian Palm Oil Plantation sector that have been summarized. The significance of the study and scope along with the justification has been highlighted. The chapter list out the research questions and objectives to be achieved.

REFERENCES

17th Annual Global CEO Survey. (2014). *17th Annual Global CEO Survey : Telling the India story*. www.pwc.in.

Abdullah, R., & Wahid, M. (2010a). World Palm Oil Supply, Demand, Price and Prospects: Focus on Malaysian and Indonesian Palm Oil Industry. *Malaysian Palm Oil Board Press*, 1–30.

Abdullah, R., & Wahid, M. B. (2010b). World Palm Oil Supply, Demand, Price and Prospets: Fous on Malaysian and Indonesian Palm Oil Industry. *Malaysian Palm Oil Board MPOB*, 1–30.

Accenture. (2011). Accenture Sustainability Services - Integrated sustainability programs to drive greater business value and high performance, 1–12. Retrieved from www.accenture.com/sustainability

Aggoune, S., Imache, R., Khadraoui, A., & Mezghiche, M. (2011). Evaluation of e-government information systems agility in the perspective of sustainability. *Lecture Notes in Computer Science (including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *6866 LNCS*, 315–329. doi:10.1007/978-3-642-22961-9_25

Armstrong, C. E., & Shimizu, K. (2007). A Review of Approaches to Empirical Research on the Resource-Based View of the Firm . *Journal of Management*, *33*, 959–986. doi:10.1177/0149206307307645

Avittathur, B., & Swamidass, P. (2007). Matching plant flexibility and supplier flexibility: Lessons from small suppliers of U.S. manufacturing plants in India. *Journal of Operations Management*, *25*, 717–735. doi:10.1016/j.jom.2006.05.015

Barros, E., Darryl, H., Krogt, R. Van Der, & Anish, G. (2012). Using sustainability to cultivate high performance in agribusiness, 1–16. Retrieved from www.accenture.com

Basiron, Y. (2007). Palm oil production through sustainable plantations. *European Journal of Lipid Science and Technology*, *109*, 289–295. doi:10.1002/ejlt.200600223

Becerra, M. (2008). A Resource-Based Analysis of the Conditions for the Emergence of Profits. *Journal of Management*, *34*, 1110–1126. doi:10.1177/0149206308324323

Bell, G. (2012). Utilising a Sociological Analytical Scheme and Intellectual Device to Critically Appreciate Software Project Management Methodologies.

Caddy, I. N., & Helou, M. M. (2007). Supply chains and their management: Application of general systems theory. *Journal of Retailing and Consumer*

Services, *14*, 319–327. doi:10.1016/j.jretconser.2006.12.001

Cameron, R. (2011). Mixed Methods Research : The Five Ps Framework. *Journal of Business Research Methods*, *9*(2), 96–108.

Chakravarthy, B. S. (1982). Adaptation: A Promising Metaphor for Strategic Management. *Academy of Management Review*, *7*(I), 35–44. doi:10.5465/AMR.1982.4285438

Chen, L. (2012). A mixed methods study investigating intangibles in the banking sector. Retrieved from http://theses.gla.ac.uk/3267/

Ching, H. Y., Gerab, F., & Toste, T. H. (2014). Scoring Sustainability Reports using GRI indicators : A Study based on ISE and FTSE4Good Price Indexes. *Journal of Management Research*, *6*(3), 27–48. doi:10.5296/jmr.v6i3.5333

Chorn, B., Sisco, C., & Joorgensen, P. M. P. (2010). The Business Case for Supply Chain Sustainability. *Bsr*, (December), 10.

Christopher, M. (2005). *Logistics and Supply Chain Management - Creating Value-Adding Networks* (3rd ed.). Prentice Hall - Financial Times.

Christopher, M. (2008). The Agile Supply Chain: Competing in Volatile Markets., *44*, 37–44. doi:10.1016/S0019-8501(99)00110-8

Chuang, L., Liu, C., Tsai, W., & Huang, C. (2010). Towards an analytical framework of organizational innovation in the service industry. *African Journal of Business Management*, *4*(May), 790–799.

Cm, C., & Christensen, C. M. (2001). The past and future of competitive advantage. *MIT Sloan Management Review*, *42*(2), 105–109.

D'Souza, S. C., & Sequeira, A. H. (2012). MBNQA-A Strategic Instrument for Measuring Performance in Healthcare Organizations: An Empirical Study. *International Journal of Multidisciplinary Research*, *1*(5), 119–129. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2018091

Dardak, R. A. (2015). Transformation of Agricultural Sector in Malaysia Through Agricultural Policy.

Dauda, M. (2008). *Diffusion of agile supply chains attributes : A study of the UK upstream oil and gas industry cluster by*.

Dawson, G., & O'Gorman, D. (2013). Palm Oil in Australia; Facts, Issues and Challenges, 1–60.

De Leeuw, a. C. J., & Volberda, H. W. (1996). On the concept of flexibility: A dual control perspective. *Omega*, *24*(2), 121–139. doi:10.1016/0305-0483(95)00054-2

DeAngelis, S. F., & Hayes, B. C. (2012). Supply Chain Agility: Does it Matter? *Enterra Insights*, 1–5. Retrieved from

http://enterpriseresilienceblog.typepad.com/enterprise_resilience_man/2...

Dixon, M., & Ross, P. (2011). Measuring the benefits of agility at work, (May), 28.

Dixon, P. (2009). Rapid Innovation - How to Grow Your Business. *Global Change Ltd*, 1–5. Retrieved from http://www.globalchange.com/rapid-innovation-how-to-make-it-happen.htm

Dlamini, B. P. (2012). Analysing the competitiveness of the agribusiness sector in Swaziland, (June), 1–133.

Done, A. (2011). Supply-chain evolution: Knowledge-based perpectives. *IESE Business School*, *D*, 1–28. Retrieved from http://www.iese.edu/

Eastwood, J. G., Jalaludin, B. B., & Kemp, L. a. (2014). Realist explanatory theory building method for social epidemiology: a protocol for a mixed method multilevel study of neighbourhood context and postnatal depression. *SpringerPlus*, *3*, 12. doi:10.1186/2193-1801-3-12

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *Academy of Management Review*, *14*(4), 532–550. doi:10.5465/AMR.1989.4308385

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, *50*(1), 25–32.

Fang, C., Chang, S., & Chen, G. (2011). Organizational learning capability and organizational innovation: The moderating role of knowledge inertia. *African Journal of Business …*, *5*(5), 1864–1870. doi:10.5897/AJBM10.947

Feilzer, M. Y. (2010). Pragmatically : Implications for. doi:10.1177/1558689809349691

Fiates, G. G. S., Fiates, J. E. A., Serra, F. a R., & Ferreira, M. P. (2010). Innovation environment in small technology-based companies. *Journal of Technology Management and Innovation*, *5*(3), 81–95. doi:10.4067/S0718-27242010000300006

Garcia-Crespo, A., Ruiz-Mezcua, B., Lopez-Cuadrado, J. L., & Gonzalez-Carrasco, I. (2011). Semantic model for knowledge representation in e-business. *Knowledge-Based Systems*, *24*(2), 282–296. doi:10.1016/j.knosys.2010.09.006

Gay, B., & Weaver, S. (2011). Theory building and paradigms: A primer on the nuances of theory construction. *American International Journal of Contemporary Research*, *1*(2), 24–32. Retrieved from http://www.aijcrnet.com/

Glaser, B., & Strauss, A. (1999). The Discovery of Grounded Theory: Strategies for Qualitative Research. *American Sociological Review*, *36*, 271. doi:10.2307/2094063

Glavič, P., & Lukman, R. (2007). Review of sustainability terms and their definitions.

Journal of Cleaner Production, *15*, 1875–1885. doi:10.1016/j.jclepro.2006.12.006

Glenn, M. (Sponsored B. E. (2009). Organisational agility : How business can survive and thrive in turbulent times. *The Economist: Economist Intellingence Unit*, *March*, 1–28. Retrieved from http://www.emc.com/collateral/leadership/organisational-agility-230309.pdf

Gunasekaran, a., Patel, C., & McGaughey, R. E. (2004). A framework for supply chain performance measurement. *International Journal of Production Economics*, *87*, 333–347. doi:10.1016/j.ijpe.2003.08.003

Gunasekaran, a., Patel, C., & Tirtiroglu, E. (2001). Performance measures and metrics in a supply chain environment. *International Journal of Operations & Production Management*, *21*(1), 71–87. doi:10.1108/01443570110358468

Haanaes, K., David, A., Balagopal, B., Kong, T. M. M., Reeves, M., Velken, I., … Hopkins, M. S. (2011). *Sustainability : The " Embracers " Seize Advantage*. *MIT Sloan Management Review*. Massachusetts Institute of Technology.

Hall, R. (2013). Mixed Methods : In Search of a Paradigm. *Conducting Research in a Changing and Challenging World*, 71–78.

Hartványi, T., & Nagy, Z. (2008). Agility in Supply Chains. *Acta Technica Jaurinensis Series Logistica*, *1*(2), 315–323. Retrieved from http://acta.sze.hu/index.php/acta/article/view/82

Hessami, A. G., Hsu, F., & Jahankhani, H. (2009). A systems framework for sustainability. *Communications in Computer and Information Science*, *45*, 76–94. doi:10.1007/978-3-642-04062-7_9

Hiles, D. R. (2008). Axiology. In L. M. Given (Ed.), *The SAGE Encyclopedia of Qualitative Research Methods Sampling* (pp. 53–57). Thousand Oaks: SAGE Publications, Inc. doi:http://dhttp://dx.doi.org/10.4135/9781412963909.n31

Hill, J., & McGowan, P. (1999). Small business and enterprise development: questions about research methodology. *International Journal of Entrepreneurial Behaviour & Research*, *5*, 5–18. doi:10.1108/13552559910259829

Hookway, C. (2013). Pragmatism.

Jackson, L., van Noordwijk, M., Bengtsson, J., Foster, W., Lipper, L., Pulleman, M., … Vodouhe, R. (2010). Biodiversity and agricultural sustainagility: From assessment to adaptive management. *Current Opinion in Environmental Sustainability*, *2*, 80–87. doi:10.1016/j.cosust.2010.02.007

Jakubik, M. (2011). Becoming to know. Shifting the knowledge creation paradigm. *Journal of Knowledge Management*, *15*(3), 374–402. doi:10.1108/13673271111137394

James, W. (1970). Pragmatism : and other Essays, 313.

Jick, T. D. (1979). Mixing Qualitative and Quantitative Methods : Triangulation in Action. *Administrative Science Quarterly*, *24*(December), 602–611. doi:10.2307/2392366

Johnson, B. R., & Onwuegbuzie, A. J. (2004). Mixed Methods Research : A Research Paradigm Whose Time Has Come. *Educational Researcher*, *33*(7), 14–26. doi:10.3102/0013189X033007014

Joshi, D., Nepal, B., Rathore, A. P. S., & Sharma, D. (2013). On supply chain competitiveness of Indian automotive component manufacturing industry. *International Journal of Production Economics*, *143*, 151–161. doi:10.1016/j.ijpe.2012.12.023

Kassim, N. M., & Zain, M. (2004). Assessing the Measurement of Organizational Agility. *Journal of American Academy of Business, Cambridge*, *4*(March), 174–177. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=12439777&site=ehost-live

Keats, B. W., & Hitt, M. a. (1988). a Causal Model of Linkages Among Environmental Dimensions, Macro Organizational Characteristics, and Performance. *Academy of Management Journal*, *31*, 570–598. doi:10.2307/256460

Klustner, K. (2008). Top 10 Reasons To Green IT. *Business Sector Media, LLC*, 1–5. Retrieved from http://www.environmentalleader.com/2008/02/05/top-10-reasons-to-green-it/

Kumar, V., Fantazy, K. a., Kumar, U., & Boyle, T. a. (2006). Implementation and management framework for supply chain flexibility. *Journal of Enterprise Information Management*, *19*(3), 303–319. doi:10.1108/17410390610658487

Labuschagne, C., Brent, A. C., & Van Erck, R. P. G. (2005). Assessing the sustainability performances of industries. *Journal of Cleaner Production*, *13*, 373–385. doi:10.1016/j.jclepro.2003.10.007

Latruffe, L. (2010). Competitiveness , Productivity and Efficiency in the Agricultural and Agri- Food Sectors. *OECD Food, Agricultural and Agri-Food Sectors*, *N°30*(30), 1–63. doi:10.1787/5km91nkdt6d6-en

Lee, G., & Xia, W. (2010). Toward Agile: An Integrated Analysis of Quantitative and Qualitative Field Data on Software Development Agility. *MIS Quarterly*, *34*(1), 87–114.

Lewin, K. (1946). Action Research and Minority Problems. *Journal of Social Issues*, *2*(4), 34–46. doi:10.1111/j.1540-4560.1946.tb02295.x

Liao, S.-H., & Wu, C. (2010). System perspective of knowledge management, organizational learning, and organizational innovation. *Expert Systems with Applications*, *37*(2), 1096–1103. doi:10.1016/j.eswa.2009.06.109

Lim, S. K., & Mavondo, F. T. (1990). The structure of strategic capabilities , implications for organisational agility and superior performance : a conceptual framework. Retrieved from http://mssanz.org.au/MODSIM03/Volume_04/C06/08_Lim.pdf

Maanen, J. Van. (2011). *Tales of the Field: On Writing Ethnography* (Second., Vol. 34). Chicago and London: University of Chicago press.

McCool, S. F., & Stankey, G. H. (2004). Indicators of sustainability: Challenges and opportunities at the interface of science and policy. *Environmental Management*, *33*(3), 294–305. doi:10.1007/s00267-003-0084-4

Milne, M. J., Ball, A., & Gray, R. (2008). W (h) ither ecology? The triple bottom line, the global reporting initiative, and corporate sustainability reporting. In *American Accounting Association*. Retrieved from http://www.acis.canterbury.ac.nz/documents/Markus_Milne_Research_Programmes/Wither_Ecology_TBL,_GRI_and_Corporate_Sustainability_Reporting.pdf

Mintzberg, H. (1979). An emerging strategy of direct research. *Administrative Science Quarterly*, *24*(4), 582–589. doi:10.2307/2392364

Nagiah, C., & Azmi, R. (2012). A Review of Smallholder Oil Palm Production: Challenges and Opportunities for Enhancing Sustainability- A Malaysian Perspective. *Journal of Oil Palm and the Environment*, *3*(November), 114–120. doi:10.5366/jope.2012.12

Neely, A., & Hii, J. (1998). *Innovation and Business Performance : A Literature Review*.

Ngah, R., & Ibrahim, A. R. (2012). The Relationships of Intellectual Capital, Innovation and Organizational Performance : A Preliminary Study in Malaysian SMES. *Advance in Global Business Research - 9th World Congress*, *9*, 593–596.

Odame, H. H., Hall, A., & Dorai, K. (2012). Assessing, Prioritizing, Monitoring, Coordination and Collective Action for and Evaluating Agricultural Innovation Agricultural Innovation Systems. In *The World Bank* (p. 658). doi:10.1596/978-0-8213-8684-2

Ong, T. S., Teh, B. H., Lau, C. K., & Wong, S. L. S. (2010). Adoption and Implementation of Balanced Scorecard in Malaysia. *Asia-Pacific Management Accounting Journal*, *5*(1), 21–40. doi:10.1097/ADM.0b013e3181d41ddb

Padel, S., Niggli, U., Pearce, B., Schlüter, M., Schmid, O., Cuoco, E., … Micheloni, C. (2010). *Implementation Action Plan for Organic Food and Farming Research. Technology Platform "Organics" Implementation Action Plan*. TP Organics c/o IFOAM EU Group. Retrieved from www.tporganics.eu

Performance Management and Delivery Unit. (2010). *Economic Transformation Programme: A Roadmap for Malaysia*. *Prime Minister Department, Malaysia*. doi:10.1002/047167849X.bio071

Performance Management and Delivery Unit. (2012). *Economic Transformation Programme Annual Report 2011*. *Prime Minister Department, Malaysia*. doi:ISSN:2232-1411

Pham, D. T., & Thomas, A. J. (2012). Fit manufacturing: a framework for sustainability. *Journal of Manufacturing Technology Management*, *23*, 103–123. doi:10.1108/17410381211196311

Posthuma, R. A., Campion, M. a C. a. C., Masimova, M., & Campion, M. a C. a. C. (2013). *A High Performance Work Practices Taxonomy: Integrating the Literature and Directing Future Research*. *Journal of Management* (Vol. 39). doi:10.1177/0149206313478184

Prater, E., Biehl, M., & Smith, M. A. (2001). International supply chain agility - Tradeoffs between flexibility and uncertainty. *International Journal of Operations & Production Management*, *21*(5/6), 823–839. doi:10.1108/01443570110390507

Reisman, J., & Gienapp, A. (2004). *Theory of Change: A Practical Tool for Action, Results and Learning*. *Organisational Research Services*. Retrieved from papers2://publication/uuid/54216947-5317-4A48-9F70-E367BF1A3FB4

Ruwhiu, D., & Cone, M. (2010). Advancing a pragmatist epistemology in organisational research. *Qualitative Research in Organizations and Management: An International Journal*, *5*, 108–126. doi:10.1108/17465641011068884

Salami, M., & Vazin, M. (2012). Effective Factors on the Agility of IRIB. *Journal of Basic and Applied Scientific Research*, *2*(8), 8011–8018.

Salim, I. M., & Sulaiman, M. (2011). Organizational Learning, Innovation and Performance: A Study of Malaysian Small and Medium Sized Enterprises. *International Journal of Business and Management*, *6*(12), 118–125. doi:10.5539/ijbm.v6n12p118

Sánchez, A. M., & Pérez, M. P. (2005). Supply chain flexibility and firm performance: A conceptual model and empirical study in the automotive industry. *International Journal of Operations & Production Management*, *25*, 681–700. doi:10.1108/01443570510605090

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for Business Students* (5th ed.). England: Pearson Education Limited.

Sawhney, M., Wolcott, R. C., & Arroniz, I. (2006). The 12 Different Ways for Companies to Innovate. *MIT Sloan Management Review*, *47*(3), 75–81.

Sharifi, H., & Zhang, Z. (1999). Methodology for achieving agility in manufacturing organisations: an introduction. *International Journal of Production Economics*, *62*, 7–22. doi:10.1016/S0925-5273(98)00217-5

Sherehiy, B., Karwowski, W., & Layer, J. K. (2007). A review of enterprise agility: Concepts, frameworks, and attributes. *International Journal of Industrial Ergonomics*, *37*, 445–460. doi:10.1016/j.ergon.2007.01.007

Singh, R. K., Murty, H. R., Gupta, S. K., & Dikshit, A. K. (2007). Development of composite sustainability performance index for steel industry. *Ecological Indicators*, *7*(3), 565–588. doi:10.1016/j.ecolind.2006.06.004

Smith, E. E., & Perks, S. (2010). A perceptual study of the impact of green practice implementation on the business functions. *Southern African Business Review*, *14*(3), 1–29.

Sparling, D. (2011). Sustainability and the business of agriculture.

Sundram, Veera Pandiyan Kaliani, S., Abdul Razak, I., & Govindaraju. (2011). Supply chain management practices in the electronics industry in Malaysia. *Benchmarking*, *18*, 834–855. doi:10.1108/14635771111180725

Taneja, P., Vellinga, T., & Ros, R. (2012). Role of Flexibility in Sustainable Port Development, (June), 18–20.

Tanner, S. J. (2005). Is Business Excellence of any Value? *EC for BE*, 1–26.

Taplin, D. H., Clark, H., Collins, E., & Colby, D. C. (2013). *Theory of Change - Technical Papers*. *Center for Human Environments*. New York. Retrieved from http://www.theoryofchange.org/wp-content/uploads/toco_library/pdf/ToC-Tech-Papers.pdf

Teddlie, C., & Tashakkori, A. (2010). Overview of contemporary issues in mixed methods research. *... of Mixed Methods in Social and Behavioral Research*, 1–41. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Overview+of+contemporary+issues+in+mixed+methods+research#0

Teoh, H. (2010). Key Sustainability Issues in the Palm Oil Sector. *World Bank Group*.

Thompson, A. W., Larsson, T. C., & Broman, G. (2011). Towards Sustainability-Driven Innovation through Product-Service Systems. doi:10.1007/978-3-642-19689-8

Upton, D. M. (1994). The Management of Manufacturing Flexibility. *California Management Review*, *36*, 72–89. doi:10.2307/41165745

Velarde, R. (2011). Sustainability Law : Is it possible to have a successful sustainable business without green demand. *Lewis & Clark Law School*, 1–5. Retrieved from http://sustainabilityandlaw.com/2011/04/25/is-it-possible-to-have-a-successful-sustainable-business-without-green-demand-by-rodrigo-velarde/

Verma, A., & Seth, N. (2011). A Conceptual Framework for Supply Chain Competitiveness. *International Journal of Human and Social Sciences*, *6*, 5–10.

Vickery, S., Calantone, R., & Dröge, C. (1999). Supply Chain Flexibility : An Empirical Study. *The Journal of Supply Chain Management*, 16–24.

Vince, R. (2001). Power and emotion in organizational learning, *44*(0), 1–25. doi:019197

Vinodh, S. (2010). Improvement of agility and sustainability: A case study in an Indian rotary switches manufacturing organisation. *Journal of Cleaner Production*, *18*(10-11), 1015–1020. doi:10.1016/j.jclepro.2010.02.018

Vinodh, S., Devadasan, S. R., Vasudeva Reddy, B., & Ravichand, K. (2010). Agility index measurement using multi-grade fuzzy approach integrated in a 20 criteria agile model. *International Journal of Production Research*, *48*(April 2013), 7159–7176. doi:10.1080/00207540903354419

Vinodh, S., Uday Kumar, V., & Jeya Girubha, R. (2012). Thirty-criteria-based agility assessment: A case study in an Indian pump manufacturing organisation. *International Journal of Advanced Manufacturing Technology*, *63*, 915–929. doi:10.1007/s00170-012-3988-4

Volberda, H. W. (1996). Towards the Flexible Form: How to Remain Vital in Hypercompetitive Environments. *Organization Science*, *7*(4), 359–374.

Wang, B. C. L., Ahmed, P. K., Wang, C. L., & Ahmed, P. K. (2002). A Review of the Concept of Organisational Learning. *Management*, *44*(0), 1–19. doi:10.1108/09696470310457469

Weng, C. K. (2005). Best-developed practices and sustainable development of the oil palm industry. *Journal of Oil Palm Research*, *17*, 124–135. Retrieved from http://palmoilis.mpob.gov.my/publications/joprv17dec-ms124.pdf

WWF-Malaysia. (2012). WWF-Malaysia Strategy 2012-2020, 1–102. Retrieved from www.panda.org

Yaacob, M. R. (2007). An Investigation of the Malaysian Palm Oil Industry ' s Environmental Strategies , Stakeholders ' Pressure , Environmental Effectiveness and Competitive Advantage, 1–459.

Yin, R. K. (2009). *Case study research: design and methods* (3rd ed.). Sage Publications.

Yusuf, Y. Y., Gunasekaran, A., Musa, A., El-Berishy, N. M., Abubakar, T., & Ambursa, H. M. (2013). The UK oil and gas supply chains: An empirical analysis of adoption of sustainable measures and performance outcomes. *International Journal of Production Economics*, *146*(2), 501–514. doi:10.1016/j.ijpe.2012.09.021

Yusuf, Y. Y., Sarhadi, M., & Gunasekaran, a. (1999). Agile manufacturing: the drivers, concepts and attributes. *International Journal of Production Economics*, *62*, 33–43. doi:10.1016/S0925-5273(98)00219-9